Bell Atlantic/NYNEX 1997-2000 Merger Cost Savings
Summary of BA-NY Intrastate Savings
($ Millions)

	Description	1997	1998	1999	2000	2001
1.	Total Bell Atlantic Merger Expense Savings (from K. O'Quinn's Exhibit, Part I, Line 3)	155.0	460.0	752.0	1,077.0	1,077.0
2.	BA-NY Intrastate Regulated Merger Savings (from K. O'Quinn's Exhibit, Part I, Line 7)	27.3	92.5	150.0	219.5	219.5
3.	BA-NY Intrastate Regulated Merger Costs (from K. O'Quinn's Exhibit, Part III)	47.2	43.2	38.2	0.6	0.0
4.	BA-NY Intrastate Net Merger Savings (from K. O'Quinn's Exhibit, Part IV)	(19.9)	49.3	111.8	218.9	219.5
5.	Costs Due to Additional Commitments (from K. O'Quinn's Exhibit, Part V)	(47.1)	(84.0)	(116.0)	(133.6)	(145.5)
6.	**Net Merger Savings per Company**	**(67.0)**	**(34.7)**	**(4.2)**	**85.3**	**74.0**
	Staff Adjustments					
7.	Savings from MIT Analysis	3.5	11.0	18.3	26.7	26.7
8.	Savings Related to Union Employees	-	(112.6)	(6.5)	96.6	100.5
9.	Savings Related to Correct Loading Rate	0.7	3.9	8.4	10.7	11.0
10.	Savings Related to Correct Allocation	3.7	12.0	20.7	29.1	29.2
11.	Revenue Enhancements (from Staff's Testimony in Cases 96-C-0603/0599)	-	-	39.0	107.0	143.0
12.	Costs Due to Additional Commitments (from above)	47.1	84.0	116.0	133.6	145.5
13.	**Net Merger Savings per Staff**	**(12.0)**	**(36.5)**	**191.7**	**489.0**	**529.9**

This Document is Proprietary and Not Available for Public Viewing

David Garfield
Use of SCIS Model

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration	)	CC Docket No. 00-218
In the Matter of Petition of Cox Virginia Telecom, Inc., etc.	)	CC Docket No. 00-249
In the Matter of Petition of AT&T Communications of Virginia Inc., etc.	)	CC Docket No. 00-251

VERIZON VIRGINIA INC.

SURREBUTTAL TESTIMONY OF DAVID GARFIELD
(Public Version)

SEPTEMBER 21, 2001

TABLE OF CONTENTS

I. INTRODUCTION
(JDPL Issues II-1-II-1-d; II-2-c-d; IV-30; IV-36)

Q. What is your name and address?

A. My name is David Garfield. My business address is 3 Corporate Place, Piscataway, New Jersey.

Q. Please describe your educational background and academic and professional experience.

A. I attended the University of Delaware, graduating with a Bachelor's of Science Degree in Mathematics in 1976 and Rutgers University, graduating with a Master of Science Degree in Applied Mathematics in 1978. I have attended numerous Telcordia and switch vendor courses relating to switching system provisioning and engineering. I have also attended courses related to service cost studies and economic principles.

I was initially employed with Bell Laboratories in 1978 in Holmdel, New Jersey, in the Local Switching Systems Engineering Department. My initial responsibilities included area planning for remote switching and methodology development for switch replacement studies. I came to Bellcore (currently known as Telcordia Technologies) upon divestiture in 1984, continuing work on switch replacement studies with digital switching systems until 1986, where I briefly worked on DMS-100F cost model development for the Switching Cost Information System (SCIS). Upon conclusion of this work effort, I supported development of custom local area signaling services (CLASS) requirements through 1989, when I transferred to the Business Decision Support organization to work on SCIS.

Q. Please describe your experience regarding SCIS.

A. I have over twelve years experience on SCIS. During this time, I have worked on model development for Nortel's DMS100-F switching system, Stromberg-Carlson's DCO switching system, Lucent's 5ESS switching system, and Fujitsu's FETEX-150 switching system. This work included development of the model itself, development of requirements for the programming staff, testing, and documentation review. I have been responsible for the ongoing evolution of the model office portion of SCIS for the past seven years. My current responsibilities include serving as SCIS model office development team leader, modeling office development for the 5ESS switching system, and training.

Q. Have you testified in other UNE price setting proceedings?

A. Yes. I have testified as an SCIS subject matter expert in Unbundled Network Element (UNE) hearings in the states of Georgia, Alabama, Louisiana, Tennessee, North Carolina, South Carolina, and Florida.

Q. What is the purpose of your surrebuttal testimony?

A. The purpose of my testimony is to respond to two issues raised in the rebuttal testimony of the AT&T/WorldCom Recurring Cost Panel regarding Verizon VA's use of SCIS Version 2.8. I am filing this testimony at the request of Verizon VA.

Q. Please summarize your surrebuttal testimony.

A. My surrebuttal testimony addresses two issues raised by the AT&T/WorldCom Recurring Cost Panel in their rebuttal testimony. First, AT&T/WorldCom incorrectly assert that SCIS is designed to model only new switch installations. My surrebuttal testimony demonstrates that SCIS, by design, models installation of new switching systems, growth of existing switching systems, or a mix, as long as the appropriate discount input is entered into SCIS. It is not limited solely to installation of new switching systems as AT&T/WorldCom imply. Second, AT&T/WorldCom claim that the port is the appropriate cost driver for "getting started" investment and Equivalent POTS Half Call (EPHC) investment (a 5ESS switching system specific result). My surrebuttal testimony demonstrates that there is a much stronger link to usage than to ports for both types of investments, making usage the more appropriate cost driver.[1/]

II. SCIS, BY DESIGN, ESTIMATES THE INVESTMENTS OF GROWTH EQUIPMENT, SUCH AS LINE AND TRUNK ADDITIONS, IN ADDITION TO THE INVESTMENTS OF NEW SWITCHES. (JDPL Issues II-1-II-1-d; II-2-c-d; IV-30; IV-36)

Q. AT&T/WorldCom have stated that SCIS is designed to estimate the investment of a new switch. [AT&T/WorldCom Rebuttal Panel at 101-102.] Can SCIS be used to estimate the investment of growth equipment or a mix of new and growth equipment as well?

A. Yes, SCIS is designed to estimate the investment of switch growth, new switches, and a mix of new and growth switches.

[1/] More detail on this point for EPHC related investment is provided in the EPHC discussion on pages 10 through 14.

Q. Please briefly describe how SCIS models switching investments.

A. SCIS is designed to model forward-looking incremental switching investments in terms of the "cost drivers,"[2/] as defined in the switching vendor's engineering rules. To accomplish this objective, a bottom-up modeling analysis is performed utilizing the latest hardware vintages, vendor engineering rules, equipment capacities, and vendor list prices. The switch engineering rules provided by the vendors that are used in Telcordia's bottom-up modeling analysis, are applicable to both installation of new switching systems and growth of existing switching systems. That is, one set of engineering rules applies to both applications. As one can observe, regardless whether installation of a new switching system or growth of an existing switching system is being modeled, the SCIS methodology addresses the latest vendor provided technical/engineering parameters, and the user, such as Verizon, inputs its latest contract specifics.

Q. Does the July 30, 2001 letter from Telcordia support the AT&T/WorldCom claim that SCIS is designed to model only new switches? [AT&T/WorldCom Rebuttal Panel at 102.]

A. No. AT&T/WorldCom's claim that SCIS is designed to model only new switches is based solely on a misinterpretation of a Telcordia letter, dated July 30, 2001, to Mr. Bob Beyer in Verizon's Boston, MA office, discussing SCIS. This letter explains the source of Nortel and Lucent pricing information used to develop the DMS-100F and 5ESS

[2/] Line terminations by type, line CCS by type including ISDN lines, trunk terminations by type, trunk CCS by type, central processor real time, ISDN PPS, SS7 octets, remote umbilical CCS, and peripheral processor real time are some of the typical cost drivers inherent in modern day digital switching systems.

models, respectively, in SCIS. In order to enter correct discount information in SCIS, a reference price level is required. As a result, Verizon requested that Telcordia describe the source of the reference price lists so that Verizon could thereafter enter its appropriate discount input in SCIS. In general, the price list from any switch vendor used for SCIS development is the starting point from which users such as Verizon enter their discount input data. ***This allows SCIS to model new switch equipment, growth equipment, or a mix of new and growth equipment, as long as the appropriate discount input is used.***[3/] Verizon correctly requested from Telcordia a detailed explanation of the price lists Telcordia used for 5ESS and DMS-100F model development so that Verizon could determine appropriate inputs for discounts. The statement referenced by AT&T/WorldCom from Telcordia's explanation of the price lists is being misinterpreted, and is taken totally out of context.

Q. Please explain how the price lists obtained by Telcordia were used in the development of Verizon VA's discount input for SCIS.

A. Discounts entered into SCIS by its users are applied uniformly to all individual equipment items of the switching system. Verizon's testimony in this proceeding bears this out. Verizon VA has testified in this proceeding that it developed a single discount value reflecting their current vendor contracts by analyzing actual switch equipment purchases (***both installation of new switching systems and growth of existing switching systems***) over a recent period of time. Verizon determined total investment for this switching equipment based on list prices (the same price lists used for SCIS model

[3/] Appropriate line, trunk, and traffic data are required as well.

development) and based on their vendor contracts. The resulting total investments were compared to obtain a net discount reflecting Verizon's mix of new switch purchases and growth purchases, not just growth purchases.

III. VERIZON VA'S COST CAUSATIVE IDENTIFICATION OF SWITCHING EQUIPMENT BETWEEN TRAFFIC SENSITIVE AND NON-TRAFFIC SENSITIVE CATEGORIES IS CONSISTENT WITH THAT OF SCIS. (JDPL Issues II-1-II-1-d; II-2-c-d; IV-30; IV-36)

Q. Do you agree with AT&T/WorldCom that Verizon misidentified cost causation and therefore has misassigned costs to its various switch rate elements?

[AT&T/WorldCom Rebuttal Panel at 112-115.]

A. No. Verizon's identification of cost causation is consistent with cost causative assumptions used in SCIS. In particular, Verizon has done so for the two major areas addressed by AT&T/WorldCom, assignment of "getting started" investment and assignment of the Equivalent POTS Half Call (EPHC) investment categories. AT&T/WorldCom suggest that these two areas be associated with the non-traffic sensitive category while SCIS ultimately treats them as traffic sensitive.

Q. How do "getting started" investments relate to switch processor equipment?

A. SCIS determines a "getting started" investment for each switching system. This investment models the investment for processor-related equipment and other equipment independent of switch size (*i.e.*, lines and trunks) and traffic. However, the ultimate limiting resource of the processor complex is realtime (*i.e.*, milliseconds). Therefore, the processor is inherently traffic sensitive, since usage determines ultimate exhaust.

Q. Is the assumption of SCIS that the switch processor is usage-limited consistent with evolving switch technology?

A. Yes, the linkage of processor exhaust to realtime is supported by the reality of constantly-evolving switch processor capacity. Switch vendors, such as Lucent, Nortel, and Siemens have constantly evolved the processor complex of their respective digital switching systems in order to stay one step ahead of realtime demand.[4/] This evolution has enabled Lucent, Nortel, and Siemens to achieve advertised processor capacities and avoid processor exhaust situations or near exhaust scenarios that result in service degradation. In today's environment of sophisticated subscribers and services, it is improper and unrealistic to assume that processors will not exhaust throughout their life if not upgraded or retrofitted in the future, even given the capabilities of current processors. In fact, Nortel has acknowledged this by developing a sophisticated capacity management tool called **[BEGIN NORTEL PROPRIETARY]** XXX **[END NORTEL PROPRIETARY]** for use by local exchange companies such as Verizon. Local exchange companies use **[BEGIN NORTEL PROPRIETARY]** XXX **[END NORTEL PROPRIETARY]** to identify possible processor exhaust situations based on a series of demand inputs such as lines, trunks, calls and feature activations at both present and

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[4/] Consider Nortel's DMS-100F switching system as an illustration of such switch processor evolution. If a new DMS-100 was purchased in the early 1980's, Nortel supplied their current state of the art processor called NT40. If a new DMS-100 is purchased today, Nortel supplies, at a minimum, their SuperNode 70 (SN70) processor. The original NT40 processor, as well as the interim SuperNode vintages (SN10 through SN60) are no longer available for purchase and can not handle today's realtime demand from subscribers. The SuperNode 70 processor is approximately **[BEGIN NORTEL PROPRIETARY]** XXX **[END NORTEL PROPRIETARY]** times faster than the original NT40 processor. More recently, Nortel is offering their latest processor complex beyond SuperNode 70, XA-CORE, providing further evidence that even today's processors are not expected to handle the realtime load throughout the life of the switching system.

future timeframes. In the case of Siemen's EWSD switching system, the central processor complex consists of multiple processors. The precise number needed is dependent upon realtime demand, as defined in Siemens' engineering rules. Siemens has recently introduced a new type of processor, CP113C, which is **[BEGIN SIEMENS STROMBERG-CARLSON PROPRIETARY]** XXX **[END SIEMENS STROMBERG-CARLSON PROPRIETARY]** faster than its predecessor, CP113A. Furthermore, Siemens is planning to increase its maximum number of allowable call application processor per switch from **[BEGIN SIEMENS STROMBERG-CARLSON PROPRIETARY]** XXX **[END SIEMENS STROMBERG-CARLSON PROPRIETARY]** to **[BEGIN SIEMENS STROMBERG-CARLSON PROPRIETARY]** XXX **[END SIEMENS STROMBERG-CARLSON PROPRIETARY]**, further demonstrating the linkage between getting started investment and usage. Assignment of getting started investment to traffic sensitive switching elements properly accommodates such processor growth and evolution, in a manner that tracks its cause: usage.

Q. How does SCIS apportion the "getting started" investment?

SCIS apportions the getting started investment based on realtime. Telcordia obtains precise realtime consumption data from the switch vendors for different types of calls and features and incorporates this information into SCIS. As a result, SCIS provides a mechanism to apportion the getting started investment to individual calls and features based on the realtime actually consumed by such calls and features. The resulting investment is characterized as call setup related investment. This investment is

eventually combined with other usage related investment (*i.e.*, investment per minute-of-use) in the cost study process. Based on their testimony, Verizon used a more direct approach to apportion getting started investment to minute-of-use costs. In their approach, Verizon apportioned the getting started investment from SCIS's total investment report directly to total minutes-of-use from their traffic data. Using their approach, Verizon apportioned the getting started investment to the correct destination, namely usage costs.

Q. Please respond to AT&T/WorldCom's claim that "getting started" costs should be categorized as non-traffic sensitive. [AT&T/WorldCom Rebuttal Panel at 112.]

A. The FCC's *Local Competition Order*[5/] states that shared costs must be reflected in TELRIC studies. While the FCC does not state how this should take place in the TELRIC context, FCC policies reflect a general view that apportionment based on cost causation is desirable. AT&T/WorldCom are advocating an arbitrary allocation of getting started investment over ports. In contrast, Verizon VA proposes in this proceeding apportioning the getting started investment on a basis that more closely tracks cost causation, namely, usage. Call volumes on a processor are related to usage. In fact, call volumes are commonly estimated by dividing total minutes-of-use by an average holding time per call when a call load measurement is not available. The link between usage (*i.e.*, minutes-of-use) as a cost assignment mechanism and the shared "getting started" investment is stronger than that of ports. AT&T/WorldCom have offered no basis for linking ports as a good cost assignment mechanism for getting started

[5/] First Report and Order, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 FCC Rcd 15499, ¶ 682 (1996).

investment other than their belief that port elements and getting started investment are both non-traffic sensitive.

Indeed, AT&T/WorldCom acknowledge in their rebuttal testimony that cost causation is the appropriate principle for apportioning switch investments. However, AT&T/WorldCom's linkage of ports as a cost assignment mechanism for getting started investment does not yield as cost causative a result as those obtained under Verizon's methodology.

Q. AT&T/WorldCom claim that EPHC categories should be considered non-traffic sensitive. [AT&T/WorldCom Rebuttal Panel at 113-114.] Please explain what EPHC categories are and how they are limited.

A. Assignment of the EPHC categories is an issue specific to Lucent's 5ESS switching system. The 5ESS switching system is based on a distributed processor architecture using a primary building block called a switching module (SM). The common equipment of a switching module consists of a processor complex and network equipment designed to terminate line interface and trunk interface equipment. Lucent's original SM platform is called "classic SM." Lucent's most recent switching module platform is called "SM2000." In the classic SM platform, the network equipment designed to terminate line interface and trunk interface equipment has a fixed termination capacity. Once this capacity is reached, another SM needs to be purchased. In the SM2000 switching module platform, the network equipment designed to terminate line interface and trunk interface equipment is growable. That is, the network equipment can be purchased in discrete

units of capacity. Up to **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]** such units of network can be added before another SM2000 switching module needs to be purchased. In their testimony, AT&T/WorldCom correctly state that there is a port limitation associated with the network equipment. When this port limitation is reached by terminating a mixture of line interface and trunk interface equipment, another switching module must be purchased. This is true for the classic SM platform once the network capacity is reached. This is also true for the SM2000 platform once the ***maximum*** number of network units has been reached. ***However***, the processor complex provided in each SM has a call capacity limitation as well. As discussed above, switch vendors have constantly evolved the processor complex of their respective digital switching systems in order to stay one step ahead of realtime demand. This statement is also true regarding Lucent's distributed processor architecture of the 5ESS. That is, Lucent has constantly evolved the SM processor complex of the 5ESS in order to stay one step ahead of call volume demand.[6/] This evolution has enabled Lucent to achieve advertised SM processor capacities and avoid processor exhaust situations or near exhaust scenarios that result in service degradation. Since the SM processors perform a

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[6/] Lucent's classic SM processor types have evolved from SMP1 to SMP12 to SMP20 to SMP20 with data cache. SMP12 provided a **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]** increase in overall call capacity over SMP1. SMP20 provided a **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]** increase in overall call capacity over SMP12. SMP20 with data cache provided a **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]** increase in overall call capacity over SMP20. This information is taken from Lucent's Switching Engineering Procedures (SEP) **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]**. Lucent's SM2000 processor types have evolved from CORE40 to CORE60. The CORE60 processor is approximately **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]** times faster than the CORE40. This information is taken from Lucent's Switching Engineering Procedures (SEP) **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]**.

significant portion of call processing functions, it is very important for Lucent to evolve their SM processor technology to handle constantly increasing call volume loads. Assignment of EPHC related investment to traffic sensitive switching elements properly accommodates such processor growth and evolution in a manner that tracks its cause: usage.

Although Lucent has evolved their SM processor complex over time to achieve full utilization of the port capacity, there are circumstances where the realtime capacity is reached before full utilization of the port capacity. In fact, Lucent provides worksheets that allow local exchange companies to perform a detailed realtime utilization analysis of their SM processors so that exhaust or near exhaust situations can be identified[7/] and addressed by limiting the port demand on such SMs to something less than full capacity. In the case of the SM2000 platform, it is much more likely for the realtime capacity to be reached before the termination capacity associated with the maximum number of network units. In fact, Lucent's pricing and engineering tool, **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]**, estimates the realtime load on individual SM2000 switching modules and prevents its users from adding additional network units once the realtime capacity is reached. Based on Verizon VA's testimony, almost all 5ESS switching modules are modeled by the SM2000 platform in SCIS.

[7/] See Lucent's Switching Engineering Procedures (SEP) **[BEGIN LUCENT PROPRIETARY]** XXX **[END LUCENT PROPRIETARY]**.

SCIS recognizes that the SM common equipment has a dual capacity, ports and call volumes. This dual capacity phenomenon is addressed in SCIS by identifying investment that is related to actual usage of the SM processor complex (the EPHC investment categories related to usage) and investment that is related to unutilized capacity of the SM processor complex (the excess SM EPHC capacity investment categories related to ports) as separate items in its output reports.

Both Verizon and AT&T/WorldCom are in agreement in their desire to apportion the ***unutilized*** capacity portion of SM investment results (*i.e.*, excess SM EPHC capacity investment) to its cost driver, ports. However, Verizon and AT&T/WorldCom differ regarding the appropriate cost drive for the utilized capacity portion of SM investment. Verizon VA testifies that it apportioned the ***utilized*** capacity portion of SM investment to its cost driver, usage. On the other hand, AT&T/WorldCom advocate apportioning this usage related investment to ports in their testimony.

A similar dual capacity phenomenon exists regarding the line interface equipment of a switching system. Such equipment has a termination capacity (lines) and a usage capacity (minutes-of-use). This dual capacity phenomenon is addressed in SCIS in a similar manner as the SM dual capacity phenomenon described above. That is, SCIS identifies investment that is related to actual usage of the line interface equipment (line CCS investment categories related to usage) and investment that is related to unutilized capacity of the line interface equipment (the excess CCS capacity investment categories related to ports) as separate items in its output reports. In this case, AT&T/WorldCom do

not dispute the way Verizon apportions the line CCS investment categories to usage and the excess CCS capacity investment categories to ports.

Q. How did Verizon VA address the issue of dual capacity?

A. The testimony of Verizon VA addresses the dual capacity phenomenon in a consistent manner over all types of switching equipment. Specifically, investment related to actual usage of capacity is apportioned over its cost driver, usage. Investment related to unutilized capacity is apportioned over is its cost driver, ports. Verizon testifies that it did this for line termination equipment on all switching systems and for SM common equipment on 5ESS switching systems. In contrast, AT&T/WorldCom do not provide consistent treatment of the dual capacity phenomenon across line termination equipment and SM common equipment.

IV. SUMMARY AND CONCLUSION (JDPL Issues II-1-II-1-d; II-2-c-d; IV-30; IV-36)

Q. Please summarize your testimony.

A. My surrebuttal testimony has addressed two issues. First, I have shown that SCIS is able to model installation of new switching systems, growth of existing switching systems, or a mix, as long as the appropriate discount input is entered into SCIS. It is not limited solely to installation of new switching systems as AT&T/WorldCom suggest. The pricing information requested from Telcordia by Verizon enabled Verizon to develop their discount input with respect to the same starting point as that used by Telcordia in development of the SCIS model. Second, I have shown that there is a much stronger link to usage as a measure of cost causation than to ports for "getting started" investment and

Equivalent POTS Half Call (EPHC) investment, making usage the more appropriate cost driver. However, due to the dual capacity nature of 5ESS switching module common equipment (call volumes and ports), SCIS provides a further breakdown of the EPHC investment into usage related investment associated with utilized capacity and port related investment associated with unutilized capacity.

Q. Does this conclude your testimony?

A. Yes.

Declaration of Dave Garfield

I declare under penalty of perjury that the foregoing is true and correct. Executed this 17th day of September , 2001.

David Garfield

Dave Garfiield